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# Sprawl and blight

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ABSTRACT

The objective of this paper is to show how the same market failures that contribute to urban sprawl also contribute to urban blight. The paper develops a simple dynamic model in which new suburban and older central-city properties compete for mobile residents. The level of housing services generated by older properties depends on current maintenance or reinvestment expenditures. In this setting, market failures that reduce the cost of occupying suburban locations, thus leading to excessive suburban development, also depress central-city housing prices and undermine maintenance incentives, leading to deficient levels of central-city reinvestment. Corrective policies that shift population from the suburbs to the center result in higher levels of reinvestment in central-city housing, therefore reducing blight.



## 1. Introduction

Urban sprawl has become a major public policy issue in recent years, reflecting widespread complaints that the spatial growth of cities is "paving over" the American landscape in a fashion that is undesirable on environmental and aesthetic grounds.[1] In response to these concerns, many cities and states have adopted policies to limit sprawl, including various restrictions on development at the urban fringe, new charges levied on builders, and public purchases of open space.

Many commentators recognize that sprawl is in part caused by the growing populations of US cities and their rising incomes, both of which increase the derived demand for land. In addition, highway investment and growing automobile ownership are viewed as contributing to sprawl by reducing the cost of access to employment centers from suburban locations; see Glaeser and Kahn (2004) and Baum-Snow (2007).[2] While such fundamental forces naturally lead to urban spatial expansion, economists argue that sprawl can be faulted on efficiency grounds only if the operation of these forces involves market failures. Several market failures have indeed been identified, including unpriced traffic congestion, failure to account for open-space amenities in development decisions, and failure to levy marginal-cost-based infrastructure charges; see Brueckner (2000, 2001). With unpriced congestion, the social cost of commuting exceeds the private cost, and the equilibrium urban development pattern features excessively long commute trips and thus a city that is too spread out. When open-space amenities are present or when infrastructure is underpriced, the social cost of suburban land development exceeds the private cost faced by builders, again leading to inefficient urban expansion.

The objective of this paper is to show that the same market failures that contribute to urban sprawl also contribute to urban blight. More precisely, our objective is to show that urban sprawl, defined as excessive investment in new suburban properties, and urban blight, defined as deficient reinvestment in older central-city properties, result from the same underlying economic process. To achieve this goal, the paper develops a simple dynamic model of an urban economy in which new suburban properties and older central-city properties compete for mobile residents. In the model, the production of housing services from existing structures depends, in part, on maintenance or reinvestment expenditures. Then, with unpriced traffic congestion, underpriced infrastructure provision, or open-space amenities, both sprawl and blight arise from the natural operation of the land market: the cost of suburban living is inefficiently low, which distorts the allocation of population, drawing residents away from the downtown. This population shift in turn depresses housing prices in the center and undermines incentives to maintain or reinvest in existing structures. Under each market failure, the appropriate corrective policy shifts population toward the city center, improving maintenance incentives

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[1] See Richardson and Gordon (2001) and Bruegmann (2005) for a critical summary of the arguments.

[2] For a related survey that emphasizes public-finance forces in explaining sprawl, see Nechyba and Walsh (2004). For documentation of the sprawl phenomenon using satellite imagery, see Burchfield et al. (2006).

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and reducing urban blight. The analysis thus demonstrates that blight reduction is a beneficial byproduct of policies designed to control urban sprawl.

Early writers on blight and urban renewal were clearly aware of the possibility of complex relationships between central-city and suburban development. For example, Fisher (1942, pp. 334–5), writing in the *American Economic Review*, notes that improvements in transportation technology greatly expanded the land area accessible from the center of a city, resulting in a "great suburban migration" and the emergence of blight:

> This migration embraces not only residential land uses but commercial as well, and there are some indications that industrial land uses are falling into the line of march away from 'downtown' congestion, high taxes, high land 'values,' and restricted areas to the open spaces of 'suburbia.' This accelerating march to the periphery of urban areas has greatly accentuated the problem of the areas lying near the center of cities ... The areas which are thus being drained of their population and purchasing power are lumped together and called 'blighted' ... the structures in the area are progressively deteriorating ... new capital is fleeing from or refusing to enter the area.

Similar concerns are expressed by contemporary critics of sprawl; see, for example, Richardson and Gordon (2001) and Nelson et al. (2004).

Several other independent mechanisms also contribute to the problem urban blight. The most obvious, and presumably most important, is central-city poverty. A number of forces make central cities the best location for poor households (Glaeser et al., 2008), and the resulting low incomes of many central neighborhoods generate low housing qualities via the filtering process; see Braid (1986) and Bond and Coulson (1989). Another key mechanism, and the dominant issue in early studies of urban renewal, is externalities between properties. These "neighborhood effects," which influence individual maintenance and reinvestment decisions, can lead to a process of contagious neighborhood decline; see Davis (1960) and Davis and Whinston (1961). Bradbury et al. (1980, pp. 412) summarize the process as follows:

> If one unit is severely damaged ... or left vacant for an extended period ..., it detracts from the desirability of the entire neighborhood. The subsequent demand reduction in turn reduces the profitability of landlords' maintenance efforts. Additional units will run down, and may even be abandoned, and the demand for neighborhood units falls further in response. In this way, physical blight and abandonment are contagious through a process of self-fulfilling expectations.

Under this view, blight arises from the interaction of neighborhood externalities and an exogenous event causing an initial decline in maintenance or reinvestment for some properties.[3] The present analysis argues that such an exogenous trigger is unnecessary, with blight arising instead from the natural operation of the land market in the presence of sprawl-generating market failures. It would be possible to add neighborhood effects to the process that determines maintenance levels in the model, and this change would certainly amplify the impacts of market failures. The model's key difference, however, is that the initial impetus to underinvestment in central properties is an endogenous and inefficient response to market failures emanating from other sectors of the urban economy.

There are two other large literatures that bear on the relationship between suburban development and blight. First, the "spatial mismatch" literature argues that the suburbanization of jobs, coupled with discrimination in suburban labor, housing and mortgage markets, has contributed to the concentration and persistence of minority poverty (and hence blight) in central cities; see Kain (1968, 1992) and Ihlanfeldt and Sjoquist (1990). Second, the "flight from blight" explanation of post-war US suburbanization has emphasized that the process of decentralization was encouraged by a desire on the part of affluent households to escape central-city crime, poverty, racial tensions, schools, taxes, congestion and pollution; see Bradford and Kelejian (1973), Mills and Price (1984), Mieszkowski and Mills (1993) and Cullen and Levitt (1999). In contrast to these views, blight does not cause sprawl in the present model: both are equilibrium responses to more-primitive market failures.

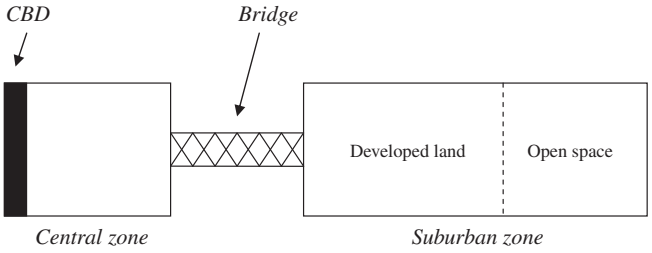


**Fig. 1.** Regional map.

The paper is organized as follows. Section 2 develops the model, assuming the absence of any of the three market failures (referred to henceforth as "distortions"). Section 3 sequentially incorporates each of the distortions, analyzes the divergence between the social optimum and laissez-faire equilibrium, and derives the appropriate corrective policy. These policies are congestion pricing, an open-space amenity tax, and a marginal-cost-based impact fee for infrastructure, and the analysis reveals their impacts on sprawl and blight.[4] Section 4 asks whether a quantity-based anti-sprawl policy (an urban growth boundary) can be used in place of Section 3's price-based policies to achieve the social optimum. Section 5 provides some additional comparative-static results, and Section 6 concludes.

## 2. The model

### 2.1. The setup

The model has two periods, denoted 1 and 2, and it focuses on a closed city experiencing population growth between the periods. For simplicity, differentiation of space in the city is limited to two zones, with commuting costs homogeneous within each zone. A central zone, whose land area is normalized to unity, contains the CBD at its left end. Since intrazonal commuting is assumed to be costless, the cost of traveling to the CBD from any location within the central zone equals zero. A suburban zone, which contains $\ell$ worth of potentially developable land, is connected to the central zone by a congestible bridge. Fig. 1 illustrates the city's spatial structure.[5]

Since intrazonal commuting is costless, commuting cost from the suburbs to the CBD is simply equal to the cost of crossing the bridge. For each commuter, this cost is given by a function $t$, which depends on the number of commuters crossing the bridge. In the absence of congestion, this function is simply a constant, with costs independent of the traffic volume. When congestion is introduced in Section 3.1 below, the function acquires a traffic-volume argument.

[3] These ideas have been extended in more-recent research on neighborhood dynamics, which includes papers by Bond and Coulson (1989), Aaronson (2001) and Rosenthal (2007).

[4] See Wheaton (1998) and Brueckner (2007) for earlier analyses of the spatial effects of congestion pricing and Brueckner (1997) for an analysis of impact fees.

[5] In their analysis of congestion pricing, Anas and Pines (2007, 2008) assume a similar structure, although in the second paper, the central land area is set at zero, with a bridge effectively connecting the suburbs to the CBD.